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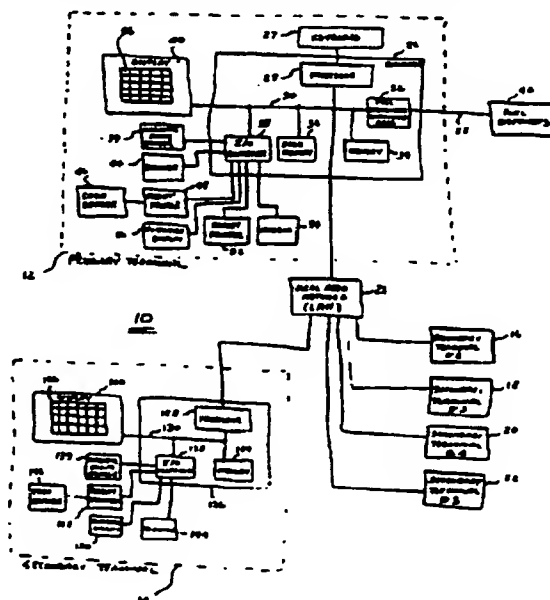
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(54) Abstract Title

Point of sale system with graphic user interface for use with fuel dispenser

(57) A point of sale system (10) of the present invention for use with a fuel dispensing system (14) includes a controller (32) for communicating with the fuel dispensing system (14), a graphic user interface (1000, 1100, 1200) having a plurality of manually actuatable areas (1202, 1204, 1206), each of which produces a selection signal (82) when touched by the user, and a computer (26) including a program (60, 68) which enables the computer (26) to operate the fuel dispensing system (14) and generate graphic icons (1104, 1114, 1108) corresponding to system operations for display on the graphic user interface (1000, 1100, 1200) over the manually actuatable areas (1202, 1204, 1206). The program (60, 68) also enables the computer (26) to execute system operations in response to the selection signals (82) produced by the manually actuatable areas (1202, 1204, 1206).



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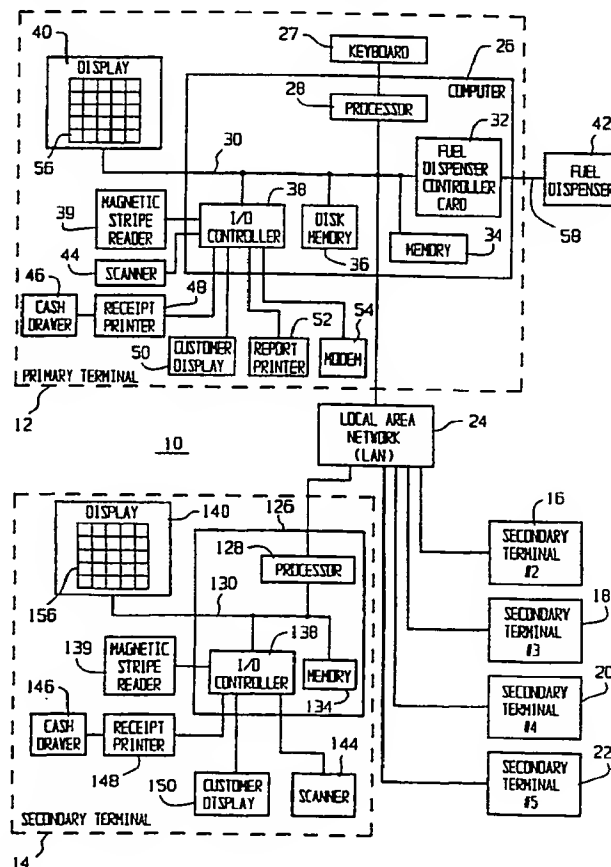
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(54) Title: POINT OF SALE SYSTEM WITH GRAPHIC USER INTERFACE FOR USE WITH FUEL DISPENSER

(57) Abstract

A point of sale system (10) of the present invention for use with a fuel dispensing system (14) includes a controller (32) for communicating with the fuel dispensing system (14), a graphic user interface (1000, 1100, 1200) having a plurality of manually actuatable areas (1202, 1204, 1206), each of which produces a selection signal (82) when touched by the user, and a computer (26) including a program (60, 68) which enables the computer (26) to operate the fuel dispensing system (14) and generate graphic icons (1104, 1114, 1108) corresponding to system operations for display on the graphic user interface (1000, 1100, 1200) over the manually actuatable areas (1202, 1204, 1206). The program (60, 68) also enables the computer (26) to execute system operations in response to the selection signals (82) produced by the manually actuatable areas (1202, 1204, 1206).



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POINT OF SALE SYSTEM WITH GRAPHIC USER
INTERFACE FOR USE WITH FUEL DISPENSER

BACKGROUND OF THE INVENTION

1. Field of the Invention.

The present invention relates to a computer-based point of sale system that provides the user a graphic interface for controlling fuel delivery and managing customer transactions.

2. Description of the Related Art

Most modern gasoline stations and convenience stores provide customer-operated (self-serve) fuel dispensers which typically are controlled and monitored from within the store by a cashier using a fuel delivery control device.

Conventional fuel delivery controllers consist of a countertop base unit with an alphanumeric display panel and a keyboard containing various function keys. When a customer is ready to pump fuel, the customer provides an indication to the controller by, for example, pushing a button on the dispenser or raising a lever after removing the fuel delivery nozzle. The controller displays a message on the display panel prompting the cashier to approve fuel delivery. The cashier approves delivery and enables the dispenser by pressing the appropriate key on the controller keyboard. After delivery, the customer tells the cashier which dispenser was used to deliver fuel. The cashier then determines the amount due for the fuel purchase by pressing a controller key corresponding to that dispenser. The controller displays the purchase price

which the cashier adds to the customer's additional purchases, if any, using a standard cash register.

Conventional fuel delivery controllers have several drawbacks when used in conjunction with standard cash registers to facilitate fuel sales in such point of sale environments. A fundamental problem is simply the burden imposed upon the cashier of simultaneously operating two separate pieces of equipment. The cashier must repeatedly shift focus from one piece of equipment to the other during the course of the day. As a result, the cashier's ability to service customers is impaired and the checkout procedure is prolonged. Additionally, greater time and resources must be devoted to cashier training since the operation of two devices must be mastered.

Conventional controllers also share the generally known disadvantages associated with most systems that employ keypads or keyboards as input devices. In order to effectively and accurately actuate keys grouped in a keyboard arrangement, the operator must possess a relatively high level of manual dexterity. Additionally, since keyboard keys employ relatively delicate moving parts, they are susceptible to mechanical malfunctions, even when properly maintained in a relatively clean environment. These disadvantages are further accentuated by the service station environment. For example, many cashiers are periodically required to perform outdoor tasks in cold weather which can greatly impair the cashier's fine motor skills, making keyboard operation even more difficult. Often, gasoline station cashiers or attendants

must handle objects contaminated with grease and other contaminants, such as during vehicle repair or maintenance. Invariably, the cashiers introduce residual contaminants into the moving parts of the keyboard by operating the fuel
5 controller, causing the keys to fail. Indeed, the service station atmosphere alone, often containing dust and smoke, can similarly interfere with proper keyboard operation.

Additionally, conventional systems using keypad or keyboard input devices are not highly intuitive to operate.
10 The input keys are often coded with relatively non-descriptive alphanumeric characters which represent predetermined system functions. Thus, the cashier must acquire an understanding of the functional consequence associated with each key and select keys corresponding to desired functions without the aid of
15 meaningful symbolic clues. As such, the cashier must possess a certain aptitude for associating cryptic key designations with abstract concepts, such as key functions, or develop such an aptitude through expensive training.

Also, since conventional controllers are text-based
20 devices which prompt the cashier to perform tasks by displaying text messages on an alphanumeric display, the cashier must be capable of interpreting the messages and responding by selecting appropriate sequences of keys. Thus, the cashier must be proficient in the language used by the
25 controller or gain such proficiency through training. Moreover, reading text messages takes time, even for cashiers with high level language skills, further prolonging the customer checkout procedure.

Finally, conventional point of sale systems provide limited assistance to store personnel in evaluating the store's sales performance because access to daily sales and inventory data using such systems is a cumbersome, time consuming process. Generally, a cashier must manually transfer data from the fuel delivery controller and cash register to a written form to consolidate funds, sales and inventory information.

SUMMARY OF THE INVENTION

The present invention provides a computer controlled point of sale system which allows the cashier to control fuel delivery and conduct customer sales transactions through a graphic user interface. The interface includes a touch sensitive screen which displays groups of graphic icons containing images which represent point of sale functions. The cashier simply touches an icon corresponding to a desired function, such as fuel delivery approval, and the system computer responds by executing the function according to the predetermined instructions of the system software. In instances when the cashier must make a series of related decisions to conduct a transaction, the computer responds to an icon selection by generating an additional arrangement of icons, functionally related to the selected icon, which provides the cashier additional options to guide the cashier through the transaction. Thus, the interface can be configured to provide comprehensive cashier assistance for a wide variety of multiple-step, point of sale operations.

Unlike conventional point of sale systems, the system of the present invention provides controls which are integrated into a single command center. The cashier operates the fuel dispensers and conducts product sales from one location.

5 Without the distraction of attending to two pieces of equipment, the cashier can service customers more efficiently. Also, since the cashier need only become familiar with the operation of a single device, the time and expense required for cashier training is reduced.

10 The touch sensitive screen of the present invention is a robust interface device, well adapted to the service station environment. Unlike conventional keyboard interfaces, the screen displays icons which operators can actuate easily. Additionally, the dirt and grease found in some gasoline
15 station environments will not affect the operation of the interface because the screen's rugged outer surface renders it virtually impervious to contamination-induced failure. In operation, the touch sensitive screen provides a single point of eye focus. Unlike
20 a keyboard used with a display, for example, where the user must look at the keyboard to touch keys, then look at the display to view the consequence of touching the keys, the touch sensitive screen provides a "look and touch" interface.

25 Unlike conventional keyboard-controlled systems, the point of sale system of the present invention is highly intuitive to operate. The icon images representing system functions are inherently meaningful and logically arranged on the screen in groups based on related system functions. The

intuitively identifiable icons arranged in this user-friendly menu structure greatly simplify the process of controlling point of sale transactions. Accordingly, customer checkout time is reduced. Moreover, since the interface is visually oriented and uses pictorial representations of abstract system functions, cashiers quickly develop a proficiency for using the interface with a minimal amount of training.

Finally, in addition to operating as an integrated point of sale command center, the present invention offers a full range of store management capabilities. Customer transactions, including fuel sales, are automatically recorded in a database. The store manager can easily generate informative compilations of store sales and product data. Since the system may include a printer, the manager can also generate daily status reports and produce hard copies of the reports.

Accordingly, an object of the present invention is to provide an integrated point of sale system for a fuel dispensing system that enables the user to control all point of sale operations from a single interface.

Another object is to provide a point of sale system for a fuel dispensing system with an interface which is simple to operate and performs reliably in a service station environment.

Another object of the present invention is to provide a point of sale system that utilizes a computer operating system that can support other commonly available application programs

and enable data interchange between the system and such other programs.

Another object of the present invention is to provide a point of sale system with a highly intuitive operator interface.

Yet another object is to provide a point of sale system for a fuel dispensing system that requires a minimal amount of training to operate.

Other objects of this invention will become apparent upon a reading of the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned and other objects and advantages of this invention, and the manner of attaining them, will become more apparent and the invention will be better understood by reference to the following description of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a block diagram of one embodiment of the present invention;

Figure 2 is a schematic diagram illustrating the physical arrangement of elements of the embodiment depicted in Figure 1;

Figure 3 is a block diagram of an embodiment of the software of the present invention;

Figure 4 is a block diagram of another embodiment of the software of the present invention;

Figure 5 is a block diagram of another embodiment of the point of sale system of the present invention;

Figure 6 is a schematic diagram illustrating the physical arrangement of elements of the embodiment depicted in Figure 5;

Figure 7 is a block diagram of yet another embodiment of the point of sale system of the present invention;

Figure 8 is a schematic diagram illustrating the physical arrangement of elements of the embodiment depicted in Figure 7;

Figure 9 is a Login screen displayed by the software of the present invention;

Figure 10 is a Main Menu screen displayed by the software of the present invention with the Sales menu option actuated;

Figure 11 is a conceptual screen diagram illustrating the architecture of the graphic user interface according to the present invention;

Figure 12 is a Main Menu screen displayed by the software of the present invention with the Fuel menu option actuated;

Figure 13 is a schematic screen diagram of the Verification task screen displayed by the software of the present invention;

Figures 14 and 15 are Verification task screens displayed by the software of the present invention; and

Figure 16 is a Help screen displayed by the software of the present invention.

Corresponding reference characters indicate corresponding parts throughout the several views. Although the drawings represent embodiments of the present invention, the drawings are not necessarily to scale and certain features may be

exaggerated in order to better illustrate and explain the present invention. The exemplifications set out below illustrate embodiments of the invention, in several forms, and such exemplifications are not to be construed as limiting the scope of the invention in any manner.

DESCRIPTION OF THE INVENTION

The embodiments disclosed in the detailed description below are not intended to be exhaustive or to limit the invention to the precise forms disclosed. Rather, the embodiments selected for the description are disclosed so that others skilled in the art may utilize their teachings.

Figure 1 shows point of sale system 10 including primary terminal 12 and at least one secondary terminal 14. For simplicity, optional secondary terminals 16, 18, 20, and 22 are shown simply as blocks and only terminal 14 is described in detail. Primary terminal 12 communicates with secondary terminals 14, 16, 18, 20, and 22 over a local area network (LAN) 24. LAN 24 may be implemented using any commonly known interface network for computer-to-computer communications. Primary terminal 12 includes computer 26, which in the exemplary embodiment is, an IBM-compatible personal computer, with keyboard 27 and central processor 28 that communicates over system bus 30 with fuel dispenser controller card 32, memory 34, disk memory 36, input/output controller 38, and display 40. Controller 32 is connected to fuel dispensers 42 and input/output controller 38 is connected to magnetic stripe reader 39, bar code scanner 44, printer 52, modem 54, customer display 50, and receipt printer 48. Cash drawer 46 is

connected to receipt printer 48. Display 40 includes a plurality of manually actuatable areas 56 and may be implemented by an infrared screen, a screen employing acoustic wave technology, a resistive screen, or any other available type of manually actuatable screen. Display 40 in the exemplary embodiment is a capacitive touch sensitive screen. As further described below, store employees control the system by touching graphic icons displayed over manually actuatable areas 56 located on the surface of display 40.

Secondary terminal 14 is similar in architecture to primary terminal 12. Terminal 14 includes computer 126 with processor 128 that communicates over system bus 130 with memory 134, input/output controller 138, and display 140. Like display 40, display 140 is a commonly available touch sensitive screen with a plurality of manually actuatable areas 156 on the surface of the screen. Input/output controller 138 is connected to magnetic stripe reader 139, bar code scanner 144, receipt printer 148, and customer display 150. Cash drawer 146 is connected to receipt printer 148.

System 10 is designed for retail store settings where several cashiers service customers simultaneously, working from and adding to a common database of information. Thus, as shown in Figure 2, primary terminal 12 is located within the store at sales counter 13 and is connected to externally located fuel dispensers 42 through communications bus 58. Primary terminal 12, which performs both cashier and management functions as will be described in detail below, is connected to secondary terminals 14, 16, 18, 20, and 22 (only

two shown) over LAN 24. Secondary terminals 14, 16, 18, 20, and 22 are also located at sales counter 13 and are typically operated by cashiers.

Referring now to Figure 3, software structure 60, which is stored in primary terminal 12 in memory 34 and disk memory 36, includes operating system 62, interface 64, and application program 66. Application program 66 is "loaded" (i.e., transferred from disk storage 36 to memory 34) for execution according to structure 60. Structure 60 enables processor 28 to receive user commands and data through interface 64 from keyboard 27, display 40, fuel dispenser controller card 32, and input/output controller 38. These inputs may be acted upon by computer 26 in accordance with application program 66. Figure 4 illustrates software structure 68, which is stored in memory 134 of secondary terminals 14, 16, 18, 20, and 22. Structure 68 includes operating system 70, interface 72, and second application program 74. Like structure 60, structure 68 enables processor 128 to receive commands and data through interface 72 from display 140 and input/output controller 138 over system bus 130. Additionally, structures 68 and 60 enable computers 126 and 26 to communicate with one another over LAN 24. In the exemplary embodiment, operating system 70 is MS-DOS, operating system 62 is Windows NT®, interface 64 is Microsoft® Windows NT, and interface 72 is Microsoft® Windows for Workgroups; both MS-DOS and Microsoft® products are available from the Microsoft Corporation of Redmond, Washington.

Figures 5 and 7 illustrate optional configurations of the point of sale system of the present invention. Figure 5 shows a system which employs a single terminal architecture.

Terminal 200 is not connected to LAN 24, but is otherwise

5 similar to primary terminal 12. Terminal 200 includes computer 226, display 240, and keyboard 227. Computer 226

includes processor 228, fuel dispenser controller card 232,

memory 234, disk memory 236, and input/output controller 238.

Like display 40, display 240 includes manually actuable areas

10 256. Peripheral devices including magnetic stripe reader 239,

bar code scanner 244, receipt printer 248, customer display

250, report printer 252, and modem 254 are connected to

input/output controller 238. Cash drawer 246 is connected to

receipt printer 248. The internal components of computer 226

15 communicate with one another and with display 240 over system

bus 230. Controller card 232 is connected to fuel dispensers

42 by communications bus 258.

Figure 6 illustrates the physical layout of single

terminal system 200. Typically, terminal 200 is operated by a

20 cashier and located at sales counter 213 within the store.

Terminal 200

communicates with the externally located, customer-operated

fuel dispensers 42 over communications bus 258.

Figure 7 shows a third point of sale system 300 which

25 includes manager workstation 312, LAN 324, and one to five

secondary terminals 314, 316, 318, 320, and 322. Secondary

terminals 314, 316, 318, 320, and 322 communicate with manager

workstation 312 over LAN 324 in a manner similar to that

described above in the context of system 10. Unlike primary terminal 12, manager workstation 312 does not include point of sale peripheral devices (i.e., magnetic stripe reader 39, display 40, scanner 44, receipt printer 48, customer display 50 and cash drawer 46) because manager workstation 312 is not designed to perform point of sale functions as will be further described below. Thus, manager workstation 312 simply includes computer 326 with monitor 376, keyboard 327, printer 352, and modem 354. However, manager workstation 312 does control fuel dispensers 42. Accordingly, computer 326 includes fuel dispenser controller card 332 which communicates with fuel dispensers 42 over communications bus 358.

Figure 8 illustrates the physical layout of workstation-based system 300. Like system 10, system 300 is designed for retail store settings where several cashiers simultaneously work from and add to a common database of information. However, unlike primary terminal 12, manager workstation 312 is dedicated to management functions and fuel dispenser control. Thus, manager workstation 312 can be located in a back office or some similar location within the store. Secondary terminals 314, 316, 318, 320, and 322 (only two shown) are situated within the store for point of sale operations at sales counter 313. Typically, manager workstation 312 is operated by a manager or some similar store employee, while secondary terminals 314, 316, 318, 320, and 322 are operated by cashiers.

MODE OF OPERATION

The following description of the operation of the invention focuses on system 10 depicted in Figures 1 and 2 as it encompasses substantially all of the functions of the other embodiments. The functional limitations of single terminal system 200 and manager workstation system 300 will be discussed in turn.

Referring now to Figures 1 through 4, software structure 60 is implemented by computer instructions stored on disk memory 38 which are loaded into memory 34. Once installed, program 66 may be configured to execute automatically when power is applied to the system by modifying the initialization procedure of operating system 62 to transfer application program 66 from disk memory 38 to memory 34 for execution. Upon execution, program 66 enables processor 28 to generate Login screen 1000 on display 40 as shown in Figure 9. Initial system setup is performed at primary terminal 12 by the appropriate store personnel, typically a manager or store owner. The manager completes the Login sequence, described in detail below, and begins the system setup procedure. To simplify the explanation of the setup procedure, an explanation of the internal system operations involved is provided in a later section. Since the basic internal system operations performed during setup (such as icon generation, processor 28 communications with memory 34, fuel dispenser controller card 32, and input/output controller 38, and processor 28 access of database information stored in disk memory 36) are functionally equivalent to those described

later in the context of other system procedures, deferred discussion of these operations should not impair an understanding of the present invention by persons skilled in the art.

5 At setup, the manager configures several database tables by following the setup instructions displayed on display 40. The manager creates an employee database table which is stored in disk memory 36 and contains information including employee numbers and employee system passwords. The manager also
10 creates a product database table for storage in disk memory 36. The product database typically contains store product information such as product description, retail price sale price, quantity in stock, and other information. Another table which contains records of customer transactions is
15 automatically created and maintained by system 10 during normal operation as will be described in detail below.

 After setup, the manager may either proceed to the basic operation of system 10 or reboot the system (referred to as "boot-up"). For simplicity, the description of the operation
20 of system 10 assumes that only one secondary terminal 14, typically operated by a cashier for processing customer transactions,, is connected to primary terminal 12 through LAN 24. At boot-up, program 66 and secondary program 74 enable computer 26 and computer 126 to display Login screen 1000 as
25 illustrated in Figure 9 on displays 40 and 140, respectively. The cashier or manager may conduct customer transactions using either primary terminal 12 or secondary terminal 14. The

following discussion assumes that a cashier chooses to use primary terminal 12.

To begin operation, the cashier provides an employee number and system password according to the instructions of Login screen 1000. Login screen 1000 includes "Exit" icon 1002, "Clear" icon 1004, "Enter" icon 1006, employee number window 1008, employee password window 1010, and icons 1012 corresponding to the numbers zero through nine. The cashier simply touches the sequence of icons 1012 representing the digits of the cashier's employee number. As the cashier touches icons 1012, corresponding numeric symbols are displayed in employee number window 1008. When all digits are entered, the cashier touches "Enter" icon 1006 and begins touching icons 1012 corresponding to the cashier's employee password. Numeric symbols corresponding to the employee password are not displayed in employee password window 1010. For security reasons an asterisk (*) is displayed for each number pressed. If the cashier mistakenly touches an incorrect icon 1012, the cashier can touch "Clear" icon 1004 and begin again. Also, the cashier can abort the login procedure by touching "Exit" icon 1002 which stops operation of program 66. Finally, after entering the correct employee password, the cashier again touches "Enter" icon 1006 which causes Login screen 1000 to be replaced with Main Menu screen 1100 as illustrated in Figure 10.

Program 66 facilitates the login procedure, as well as various other system procedures, by enabling processor 28 of computer 26 to generate graphic icons and respond to

associated selection signals. As shown in Figure 11, display 40 is divided into a grid-like format containing a plurality of manually actuatable areas 56. When program 66 enables processor 28 to display an icon generally designated 78 on display 40, icon 78 occupies a region of display 40, such as region 80, which encompasses several manually actuatable areas 56. When the cashier touches display 40 within region 80, one or more of areas 56 are actuated, producing one or more selection signals on lines 82. Program 66 interprets any selection signal or group of selection signals originating from within region 80 as a command to execute a function associated with icon 78 occupying that region. For example, when the cashier touches button-like icon 1114 representing the number "1" displayed on Login screen 1000, program 66 interprets the selection signals produced on lines 82 by areas 56 actuated within the region occupied by icon 1114 as a command to input the number one.

During the login procedure, program 66 responds to the selection signals produced on lines 82 by actuation of any of icons 1012 representing the numbers zero through nine by temporarily storing the corresponding number in memory 34 and enabling processor 28 to display a symbol of the number in either employee number window 1008 or an asterisk (*) in employee password window 1010. When the cashier finishes entering the employee number and touches "Enter" icon 1006, processor 28 compares that employee number, now temporarily stored in memory 34, with the employee numbers stored in the employee database table located in disk memory 36. If the

entered number does not match one of the numbers stored in disk memory 36, program 66 generates an error message on display 40, prompting the cashier to re-enter the number. Otherwise, the cashier proceeds by entering a password number. Again, actuation of any of icons 1012 initiates the system operation of temporarily storing the corresponding numeric value in memory 34 and displaying an asterisk (*) in employee password window 1010. When the cashier finishes entering a password and touches "Enter" icon 1006, processor 28 compares the password with the password stored in the employee database table of disk memory 36 corresponding to the cashier's employee number. If the passwords match, then program 66 enables processor 28 to replace Login screen 1000 with Main Menu screen 1100 illustrated in Figure 10. If the passwords do not match, then processor 28 generates an error message for the cashier.

Main Menu screen 1100 consists of an arrangement of main menu option icons 1102 and submenu option icons 1104. Each main menu option icon 1102 represents a group of functionally related system operations and includes a descriptive word or phrase and a graphic image which intuitively represents the corresponding submenu options. Each submenu option icon 1104 similarly includes a word and an image representing a corresponding task screen similar in arrangement to Verification task screen 1200 depicted in Figures 14 and 15. The cashier can access any task screen by touching the appropriate main menu option icon 1102 followed by the appropriate submenu option icon 1104.

The grouped set of selection signals produced on lines 82 corresponding to each main menu option icon 1102 is interpreted by program 66 as a command to enable processor 28 to generate the associated set of submenu option icons 1104 on display 40. Regardless of which main menu option icon 1102 is selected, a plurality of submenu option icons 1104 are displayed over a corresponding plurality of screen regions (sixteen regions are available in the exemplary embodiment) within submenu portion 1106 of Main Menu screen 1100. Thus, program 66 assigns a different meaning to the same selection signals produced on lines 82 by areas 56 located within each of the screen regions depending upon which submenu option icon 1104 is displayed over the producing area 56 when it is actuated. For example, when the cashier touches "Fuel" main menu option icon 1108, processor 28 generates fuel submenu option icons 1104 for display in the sixteen submenu regions of Main Menu screen 1100 as shown in Figure 12. If the cashier touches the lower left fuel submenu option icon 1110 labeled "Fuel products," then program 66 interprets the selection signals produced on lines 82 by actuated areas 56 within the region occupied by that icon as a command to display icons used during the setup of fuel products available for delivery by a particular dispenser 42.

Similarly, when the cashier touches "Sales" main menu option icon 1112, processor 28 generates sales submenu option icons 1104 in the submenu option portion 1106 of display 40. By touching "Verification" icon 1114 located in the lower left corner of submenu option portion 1106, the cashier actuates

the same areas 56 as those actuated by touching "Fuel products" icon 1110 in the previous example, thus producing the same selection signals on lines 82. When "Verification" icon 1114 is displayed, however, program 66 interprets these selection signals as a command to replace Main Menu screen 1100 with "Verification" task screen 1200 as illustrated in Figure 14.

Although the cashier can perform a variety of system operations by interacting with display 40 to proceed through various menu levels, most of the cashier's time is spent operating Verification task screen 1200. From this screen, the cashier can control the system point of sale equipment, including fuel dispensers 42 and cash drawer 46, and perform the point of sale operations associated with daily store operation.

Figures 13 and 14 show the several regions of Verification task screen 1200 of the exemplary embodiment including fuel control region 1202, task control region 1204, subtask region 1206, transaction window 1208, payment options region 1210, and cashier information window 1212. Fuel control region 1202 includes fuel dispenser icons 1214-1220, "More" icon 1222, and enable icon 1224. This region of the screen provides fuel sales information and control. The seven fuel dispenser icons 1214-1220 correspond to seven completed but as yet unpaid fuel dispensers 42. Actuation of "More" icon 1222 commands program 66 to display seven additional fuel dispenser icons in these same seven locations. A total of thirty-two icons can each be assigned to thirty-two different

fuel dispensers 42. Each fuel dispenser icon includes a fuel dispenser designation 1226 and a purchase price portion 1228.

Task control region 1204 contains various task icons, including "Dispensers" icon 1230 and "Item Sales" icon 1232.

5 Activation of any task icon commands program 66 to generate a corresponding set of subtask icons in subtask region 1206.

Transaction window 1208 includes description window 1234 and summary window 1236. Payment options region 1210 contains

icons 1238 representing currency denominations as well as

10 various function icons 1240 as will be described in further detail below. Cashier information window 1212 is divided into cashier name portion 1242, message portion 1244 and date/time portion 1246.

The following example assumes that a customer actuates
15 fuel dispenser 42 number four which results in a flashing enable icon 1224 on Verification task screen 1200 to notify the cashier of a request for dispenser authorization. The cashier touches enable icon 1224, labeled "Approve All" in the preferred embodiment, which enables any dispenser 42 with a
20 "calling" customer (i.e. a raised handle) connected to fuel dispenser controller card 32. When the customer is finished delivering the fuel, fuel dispenser icon 1215 assigned to dispenser 42 number four appears and displays the amount due for the fuel sale in purchase price portion 1228. The
25 customer then tells the cashier that dispenser 42 number four was used for fuel delivery. The cashier touches fuel dispenser icon 1215. A description of the transaction, for example "fuel @ \$1.05/gal.," is displayed in description

window 1234 of transaction window 1208. The final purchase price displayed on fuel dispenser icon 1215 is also displayed in description window 1234 as shown in Figure 14. In addition, summary window 1236 of transaction window 1208 displays the total amount due and the tax due on that amount.

If the customer also purchases a large cup of coffee, the cashier touches "Item Sales" icon 1232 displayed in task control region 1204 of Verification task screen 1200. A plurality of icons, fourteen in the exemplary embodiment, representing different products are then displayed in subtask region 1206 of Verification task screen 1200 as shown in Figure 14. The cashier touches icon 1248 which displays a mug of hot liquid labeled "Coffee." Subtask region 1206 shown in Figure 14 is then replaced with icons representing large, medium and small cups of coffee as shown in Figure 15. By touching icon 1250 representing a large coffee, the cashier enters the cup of coffee as a part of the transaction. Had the customer purchased a product having a bar code label, the cashier could have entered the product into the transaction by simply scanning the product with bar code scanner 44.

Finally, a description is displayed in description window 1234 of transaction window 1208 and the total and tax amounts shown in the summary window 1236 are increased by an amount corresponding to the price of the coffee. The total amount due is also displayed for the customer on customer display 50.

The cashier next determines the method of payment. If the customer pays cash, the cashier simply touches currency icons 1238 displayed in payment options region 1210

corresponding to the denominations received from the customer. For example., if the customer pays with a twenty dollar bill, the cashier touches currency icon 1238 displaying an image of a twenty dollar bill. Collect icon 1239 displays a running
5 total of the amounts corresponding to the currency icons 1238 pressed by the cashier. When the amount collected meets or exceeds the amount due, the cashier touches collect icon 1239 to indicate that the transaction is complete. Next, cash drawer 46 opens, and the cashier deposits the cash received
10 and withdraws the change due. Finally, customer display 50 shows the change due and receipt printer 48 prints a receipt of the transaction including the contents of transaction window 1208. The cashier then gives the customer the change due, if any, thus completing the transaction.

15 To facilitate the above-described customer transaction, primary terminal 12 may perform a series of system operations in response to input signals provided by fuel dispenser 42 fueling position number four and by the cashier using display 40. When the customer activates fuel dispenser 42 fueling
20 position number four, dispenser 42 transmits a request for authorization over communications bus 58 to fuel controller card 32. Controller card 32 determines the number of the selected dispenser and decodes the authorization request. Controller card 32 communicates this information over system
25 bus 30 to processor 28 which, according to the instructions of program 66, produces a flashing enable icon 1224 in fuel control region 1202.

When the cashier touches enable icon 1224, program 66 interprets the resulting selection signals produced on lines 82 as a command to enable dispenser 42 fueling position number four. Program 66 instructs processor 28 to issue an authorization signal over system bus 30 to controller card 32. Controller card 32 responds by transmitting a signal over communications bus 58 to enable dispenser 42 fueling position number four. As the customer pumps fuel dispenser 42 computes amount delivered and total cost based on price information supplied by system 10. Dispenser 42 transmits a signal to controller card 32 representing the cost and amount of fuel delivered. Controller card 32 communicates this information to processor 28 which, according to the instructions of program 66, updates the numeric representation of the fuel purchase price displayed in purchase price portion 1228 of fuel dispenser icon 1215 when the fuel sale is completed. When the customer returns the fuel delivery nozzle to its mounting bracket, dispenser 42 transmits a signal indicating that the fuel delivery is completed. Dispenser 42 automatically disables and remains disabled until system 10 provides another enable signal. Program 66 then enables processor 28 to store the fuel purchase price data and dispenser number in memory 34.

When the cashier determines which dispenser 42 was used for fuel delivery and touches dispenser 42 fueling position number four icon 1215, program 66 interprets the selection signals produced on lines 82 by actuated areas 56 as a command to enable processor 28 to retrieve the purchase price data

corresponding to dispenser 42 fueling position number four stored in memory 34. Processor 28 then accesses the product database in disk memory 36 to retrieve the product description for fuel sales and generates characters corresponding to that description in description window 1234. Processor 28 also reads the purchase price data corresponding to dispenser 42 fueling position number four in memory 34 and generates a numeric representation of the amount in description window 1234 and summary window 1236 as shown in Figure 14. Finally, processor 28 multiplies the purchase price data by the applicable sales tax factor stored in the product database and displays the resulting figure in numeric form in summary window 1236.

An alternative method of controlling fuel dispensers 42 is available by touching Fuel Control subtask icon 1105 in subtask region 1106 as shown in Figure 12. Once accessed, this subtask menu permits the cashier to accept pre-payment for fuel to be dispensed from a particular fueling position. The cashier can enable the fueling position individually and observe the status of the fueling position as it dispenses fuel. Once delivery is complete, an icon, such as fueling position number four icon 1215, appears in fuel control region 1202. If a subsequent customer requests authorization for fuel position number four before the first customer has paid, the cashier can again enable the fueling position. An additional fueling position number four icon 1215 will appear in fuel control region 1202 after the second delivery. After either customer identifies and pays for the fuel purchase

corresponding to that customer's fuel delivery, the appropriate fueling position number four icon 1215 will be cleared from region 1202.

When the cashier touches "Item Sales" icon 1232 to
5 process the coffee purchase, program 66 interprets the resulting selection signals as a command to display icons in subtask region 1206 corresponding, in this example, to the first fourteen products of the product database located in disk memory 36. Program 66 responds to actuation of "Coffee"
10 icon 1248 in a similar manner, producing small, medium, and large coffee icons in subtask region 1206. Program 66 interprets the selection signals produced on lines 82 by the cashier's activation of large coffee icon 1250 as a command to instruct processor 28 to access the product database location
15 corresponding to a large cup of coffee. Processor 28 retrieves description and price information from disk memory 36 and updates description window 1234 as described above. The total purchase and tax amounts displayed in summary window 1236 are also updated based this information. Additionally,
20 program 66 enables processor 28 to transmit signals representing the total amount due to input/output controller 38. Input/output controller 38 transmits corresponding signals to customer display 50 which displays the amount due.

If the item purchased has a bar code label, the cashier
25 simply scans the bar code with scanner 44. Input/output controller 38 translates the bar code information, thereby allowing processor 28 to identify the item by communicating with controller 38 over system bus 30. Program 66 then

enables processor 28 to retrieve corresponding description and price information from disk memory 36 to update transaction window 1208 as described above.

When the cashier touches payment icons 1238 representing the payment received, program 66 responds to the resulting selection signals by enabling processor 28 to update collect icon 1239 with symbols representing the amount tendered. When the cashier touches collect icon 1239, processor 28 calculates the change due and generates symbols representing that amount for display in summary window 1236. Processor 28 communicates the same information to customer display 50 through input/output controller 38 for display as described above. Additionally, processor 28 commands cash drawer 46 through controller 38 and receipt printer 48 to open so that the cashier can access the cash contained within cash drawer 46. Finally, program 66 enables processor 28 to access the data stored in memory 34 corresponding to the contents of transaction window 1208. Processor 28 transmits this data through input/output controller 38 to receipt printer 48 which prints out a record of the transaction.

If the customer pays using a credit card or similar cash substitute, magnetic stripe reader 39 communicates card swipe data to processor 28 through input/output controller 38. Processor 28 interprets receipt of swipe data as an indication of payment of the amount due. By pressing "Other" icon 1240, the cashier can access various payment specific prompts for dollar amounts or customer data.

When the cashier closes cash drawer 46, cash drawer 46 transmits a signal through receipt printer 48 to controller 38 which program 66 interprets as an indication that the transaction is complete. Program 66 responds by enabling processor 28 to access the data stored in memory 34 corresponding to the contents of transaction window 1208. Processor 28 then produces a data record of the transaction which it writes to disk memory 36 for storage in the transaction history database. Finally, the message "Transaction Complete" is displayed in transaction window 1208.

The cashier can access information further describing the system operations discussed above by pressing "Help" icon 2000. When the cashier accesses the system help function, program 66 enables processor 28 to generate a screen, such as the screen shown in Figure 16, on display 40. From such a help screen, the cashier uses help control icons 1256 to browse through a users manual stored in disk memory 36. When the cashier selects a topic, program 66 enables processor 28 to generate text messages 1258 on display 40 which provide information related to the selected topic. Some topic explanations incorporate video demonstrations which the cashier can control by actuating icons displayed in video window 1260. Figure 16 shows, for example, a video demonstration of the process of installing paper in receipt printer 48.

Primary terminal 12 also performs a number of management functions. Typically, store managers review daily

transactions to perform management functions such as reconciling the payments received with the stored transaction histories and determining fuel inventory status. Such data analysis and processing can be performed by touching "Daily Work" icon 1252 or "Reports" icon 1254 displayed on Main Menu 1100 as shown in Figure 10. By selecting appropriate menu icons from Main Menu 1100 and providing additional inputs and commands to processor 28 through keyboard 27, the manager may print various reports of the raw transaction data using printer 52. As should be apparent from the foregoing, one skilled in the art could readily modify program 66 to facilitate transfer of the transaction data to a separate program or spreadsheet utility for further data reduction and manipulation. Additionally, options could be added to the Main Menu 1100 to enable the manager to transmit reports to remote locations using modem 54.

Program 66 facilitates the management functions in response to inputs from display 40 and keyboard 27 by enabling processor 28 to perform various predetermined data computations on data stored in disk memory 36. Processor 28 then generates symbols corresponding to the results for display on display 40. If the manager requests a printout, program 66 enables processor 28 to transfer the data over system bus 30, through input/output controller 38, to printer 52. Similarly, if program 66 was modified to permit the manager to communicate with a remote location, such as a central office, to provide reports or obtain instructions, program 66 would enable processor 28 to accomplish such

communications using modem 54 according to procedures well known to those skilled in the art..

It should be apparent from the forgoing description that a cashier could have conducted the above-described transaction by using secondary terminal 14. Secondary terminal 14 contains second program 74 which is capable of performing the point of sale system operations described above. However, since fuel dispensers 42 are centrally controlled from primary terminal 12 and the system database tables are centrally stored in disk memory 36, secondary terminal 14 uses LAN 24 to communicate with fuel dispensers 42, access the employee and product database tables, and add to the transaction history database.

Single terminal system 200 as illustrated in Figure 5 differs from system 10 as illustrated in Figure 1 in that system 200 does not include networked secondary terminals 14, 16, 18, 20, and 22 which provide multiple point of sale stations. In smaller stores, however, where multiple check-out lanes are unnecessary, single terminal system 200 is preferable. With the exception of the network functions provided by LAN 24, single terminal system 200 operates substantially the same as system 10 described above.

Figures 7 and 8 show manager workstation system 300. This configuration of the point of sale system of the present invention is similar to system 10. The primary distinction between the two systems is the point of sale capabilities of primary terminal 12. Manager workstation 312, as shown, provides disk memory 336 for the system database tables and

central fuel controller 332. However, the point of sale equipment of Figure 1, including magnetic stripe reader 39, display 40, scanner 44, cash drawer 46, receipt printer 48, and customer display 50, is absent.

5 While this invention has been described as having exemplary embodiments, the present invention can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general
10 principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.

WHAT IS CLAIMED IS:

1. A point of sale system for a fuel dispensing apparatus, said system comprising:

a controller which controls and monitors the amount of fuel dispensed by the fuel dispensing apparatus;

5 a display including a plurality of manually actuatable areas, each of said areas producing a corresponding selection signal when actuated; and

a computer coupled to said controller and said display, said computer including a program for enabling said computer
10 to carry out a plurality of system operations including operating said controller and generating graphic icons corresponding to said system operations for display in said areas, said program also for enabling said computer to carry out said system operations in response to said selection
15 signals produced when said areas corresponding to said system operations are actuated.

2. System of Claim 1 wherein said areas include actuation means responsive to touching.

3. System of claim 1 further comprising an input device connected to said computer for entering data, said data including product information, and initiating said system operations by providing input signals to said program, said
5 program also enabling said computer to manage the data and produce records describing completed system operations.

4. System of Claim 3 wherein said input device includes a keyboard.

5. System of Claim 3 wherein said computer includes means for storing and retrieving data.

6. System of Claim 5 wherein said system operations include generating said icons in a menu structure including a plurality of menu levels.

7. System of Claim 6 wherein said system operations include managing customer transactions and fuel delivery, said menu structure enabling the user to access said menu levels by actuating said areas to produce said selection signals
5 corresponding to customer transaction management functions. .

8. System of Claim 7 further comprising a printing device connected to said computer for producing printouts of data, said program also enabling said computer to control said printing device.

9. System of Claim 8 further comprising a modem connected to said computer for communicating with remotely located equipment, said program also enabling said computer to control said modem.

10. System of Claim 7 further comprising a terminal coupled to said computer, said terminal including a display including a plurality of manually actuatable locations, each of said locations producing a corresponding remote selection
5 signal when actuated; and a processor coupled to said display, said processor including a second program for enabling said processor to carry out a plurality of terminal operations including communicating with said computer and generating graphic icons corresponding to said terminal operations for
10 display in said locations, said second program also for

enabling said processor to carry out said terminal operations in response to said remote selection signals produced when said locations corresponding to said terminal operations are actuated.

11. System of Claim 10 further comprising means for transmitting said communications between said computer and said processor.

12. System of Claim 11 wherein said terminal operations include generating said icons in a menu structure including a plurality of menu levels.

13. System of Claim 12 wherein said terminal operations include generating records of executed terminal operations for storage in said means for storing and retrieving data and analyzing said records.

14. System of Claim 13 further comprising a plurality of said terminals in communication with said computer through said transmission means.

15. System of Claim 13 further comprising a product code scanner connected to said processor for transmitting product identification data to said processor, said second program also enabling said processor to incorporate the product
5 identification data with data associated with said records of executed terminal operations.

16. System of Claim 13 further comprising a payment management device connected to said processor for performing terminal operations including storing payments collected during customer transactions, said second program also
5 enabling said processor to control said payment management

device in response to said remote selection signals corresponding to the customer transactions.

17. System of Claim 16 wherein said payment management device includes a receipt printer responsive to said processor for printing data corresponding to the customer transactions.

18. System of Claim 17 wherein said payment management device includes a data screen responsive to said processor for displaying data corresponding to the customer transactions.

19. System of Claim 13 wherein said processor includes means for storing data.

20. A fuel dispensing system for providing fuel to vehicles, said system comprising:

means for delivering fuel to a vehicle;

a computer connected to said fuel delivering means;

5 a display controlled by said computer having a of manually actuatable areas; and

a program stored in said computer, said program including a plurality of instructions for execution in said computer, said program enabling said computer to generate graphic icons for display in said areas as prompts to the user, said display
10 sending selection signals to said computer corresponding to those of said icons that are selected by the user, and said computer executing said instructions corresponding to said selection signals thereby enabling the user to control
15 operation of said system by selecting icons on said display.

21. A point of sale system for use with fuel dispensers, said system comprising:

a workstation including a controller for controlling and monitoring operation of the fuel dispensers, and a computer
5 coupled to said controller including a database for storing data corresponding to customer transactions, and a program which enables said computer to carry out a plurality of system operations including operating said controller and accessing said database to process the data; and

10 a terminal including a display having a plurality of manually actuable areas, each of said areas producing a corresponding selection signal when actuated, and a processor coupled to said display, said processor including a second program responsive to said selection signals for enabling said
15 processor to carry out a plurality of terminal operations including communicating with said workstation and generating graphic icons corresponding to said terminal operations for display in said areas as prompts to the user; and a network coupled between said workstation and said terminal for
20 transmitting said communications.

AMENDED CLAIMS

[received by the International Bureau on 27 February 1998 (27.02.98);
original claim 6 amended; remaining claims unchanged (1 page)]

5. System of Claim 3 wherein said computer includes means for storing and retrieving data.

6. System of Claim 5 wherein said system operations include generating said icons in a menu structure including a plurality of menu levels.

7. System of Claim 6 wherein said system operations include managing customer transactions and fuel delivery, said menu structure enabling the user to access said menu levels by actuating said areas to produce said selection signals
5 corresponding to customer transaction management functions.

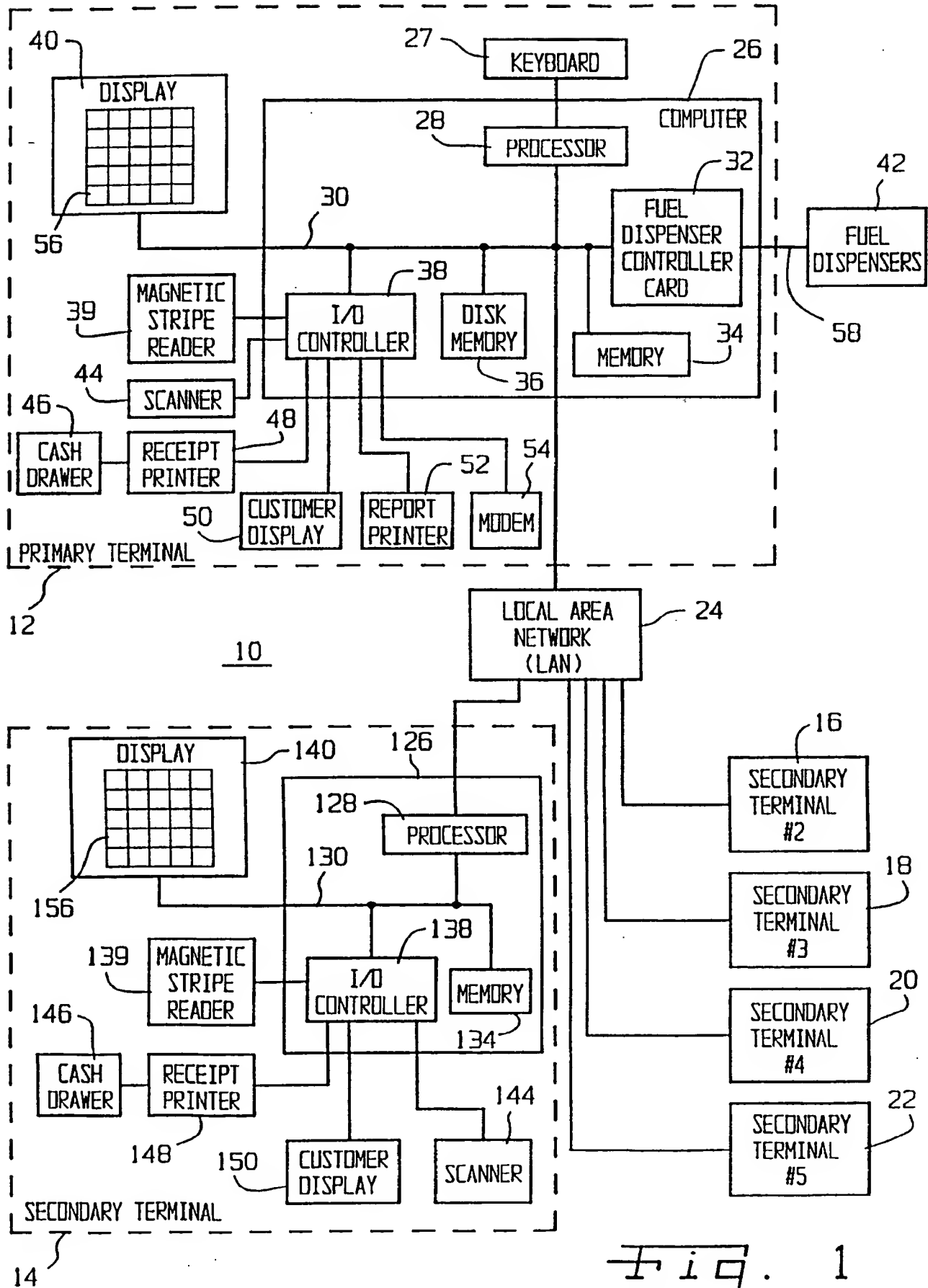
8. System of Claim 7 further comprising a printing device connected to said computer for producing printouts of data, said program also enabling said computer to control said printing device.

9. System of Claim 8 further comprising a modem connected to said computer for communicating with remotely located equipment, said program also enabling said computer to control said modem.

10. System of Claim 7 further comprising a terminal coupled to said computer, said terminal including a display including a plurality of manually actuatable locations, each of said locations producing a corresponding remote selection
5 signal when actuated; and a processor coupled to said display, said processor including a second program for enabling said processor to carry out a plurality of terminal operations including communicating with said computer and generating graphic icons corresponding to said terminal operations for
10 display in said locations, said second program also for

STATEMENT UNDER ARTICLE 19

Claim 6 is amended to directly depend from Claim 5.



2/15

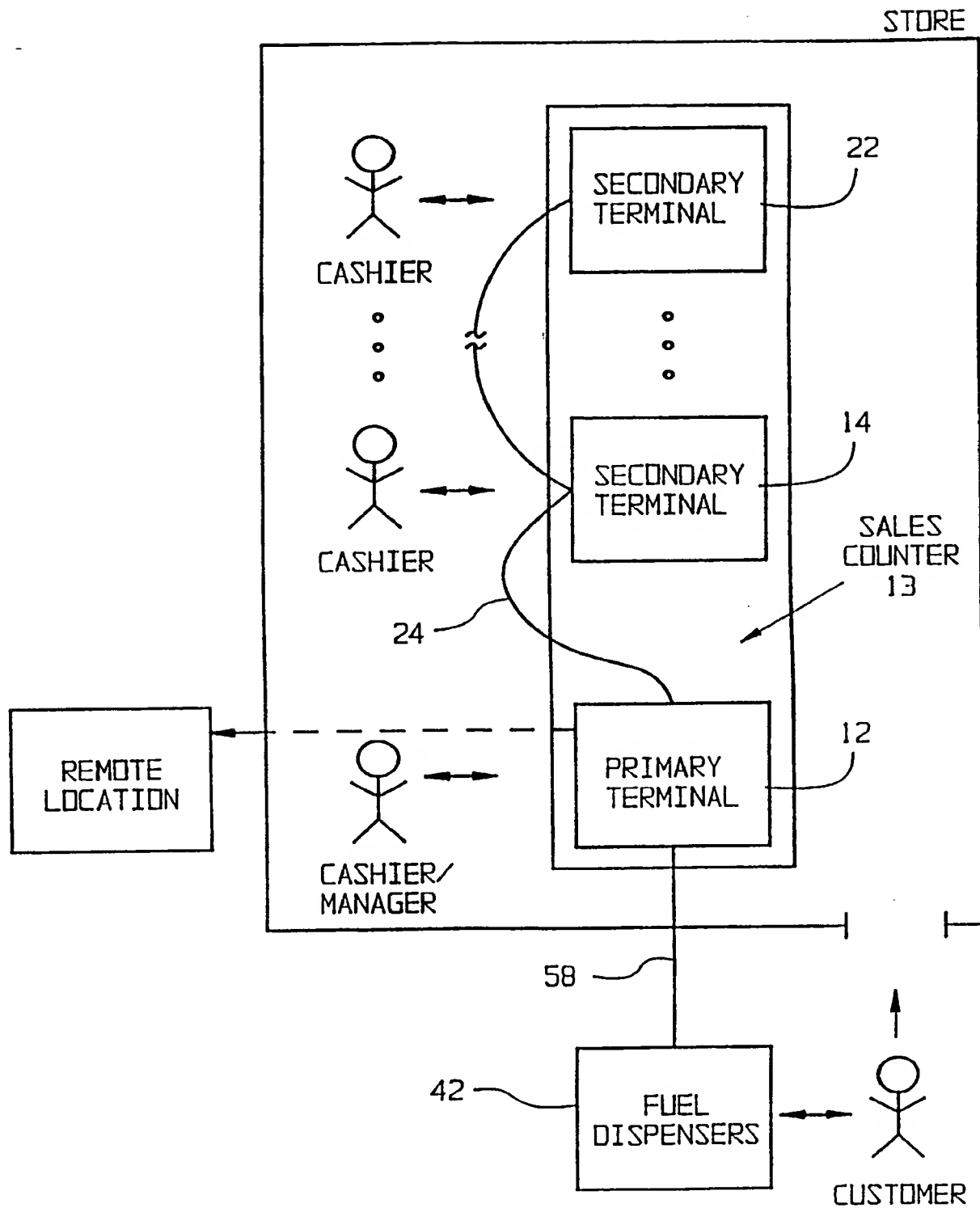
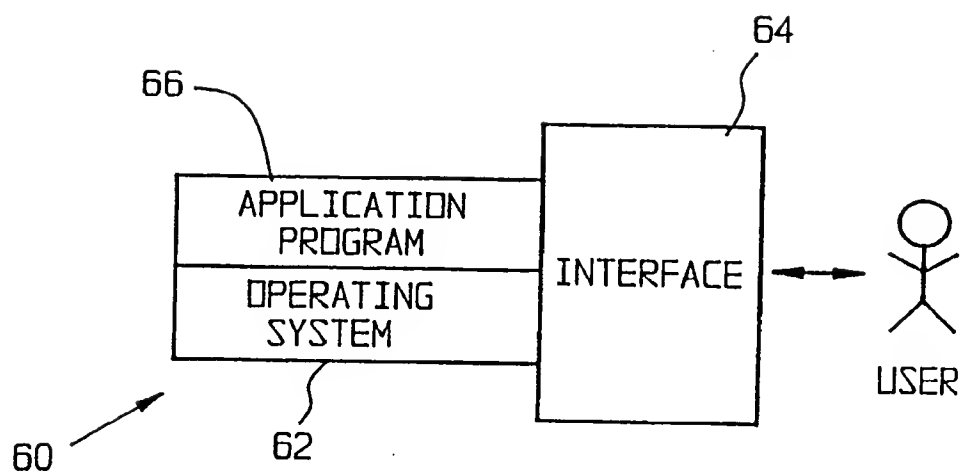
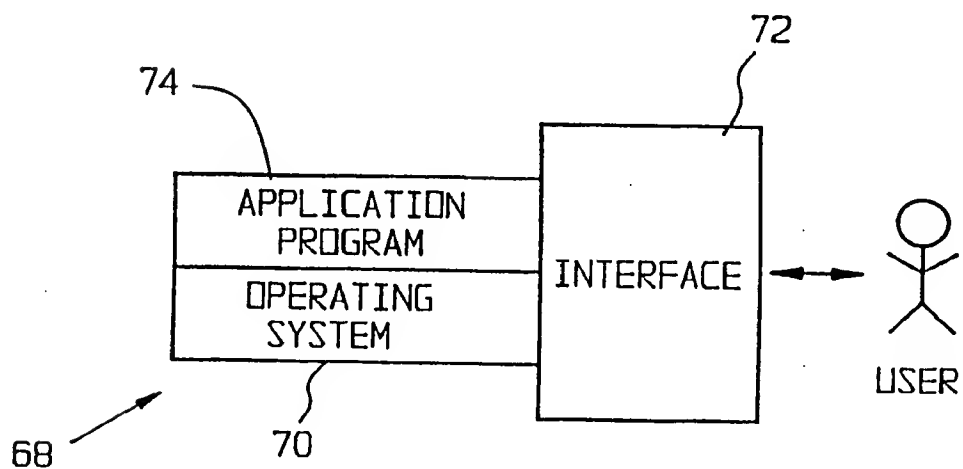


Fig. 2

*Fig. 3**Fig. 4*

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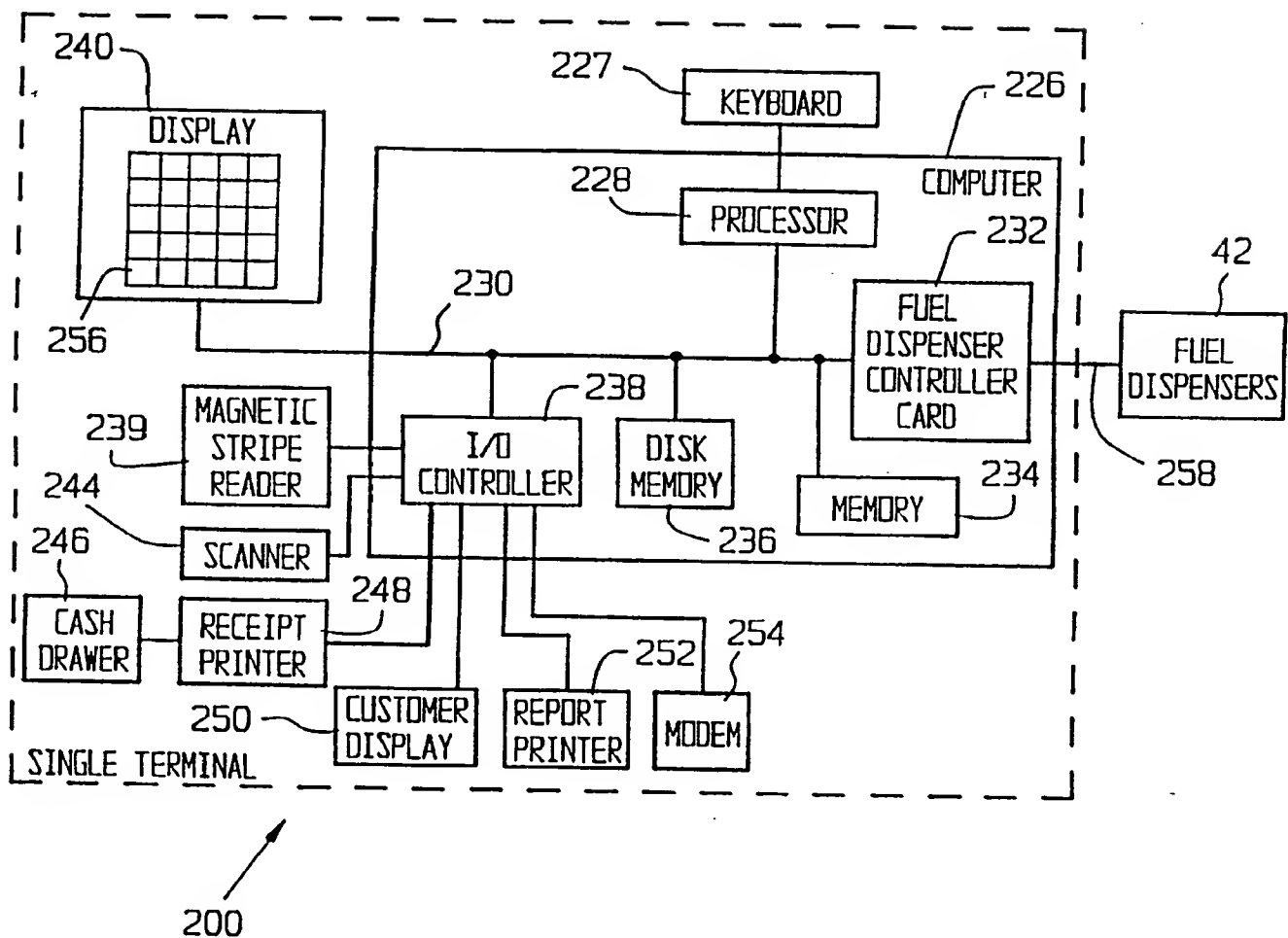
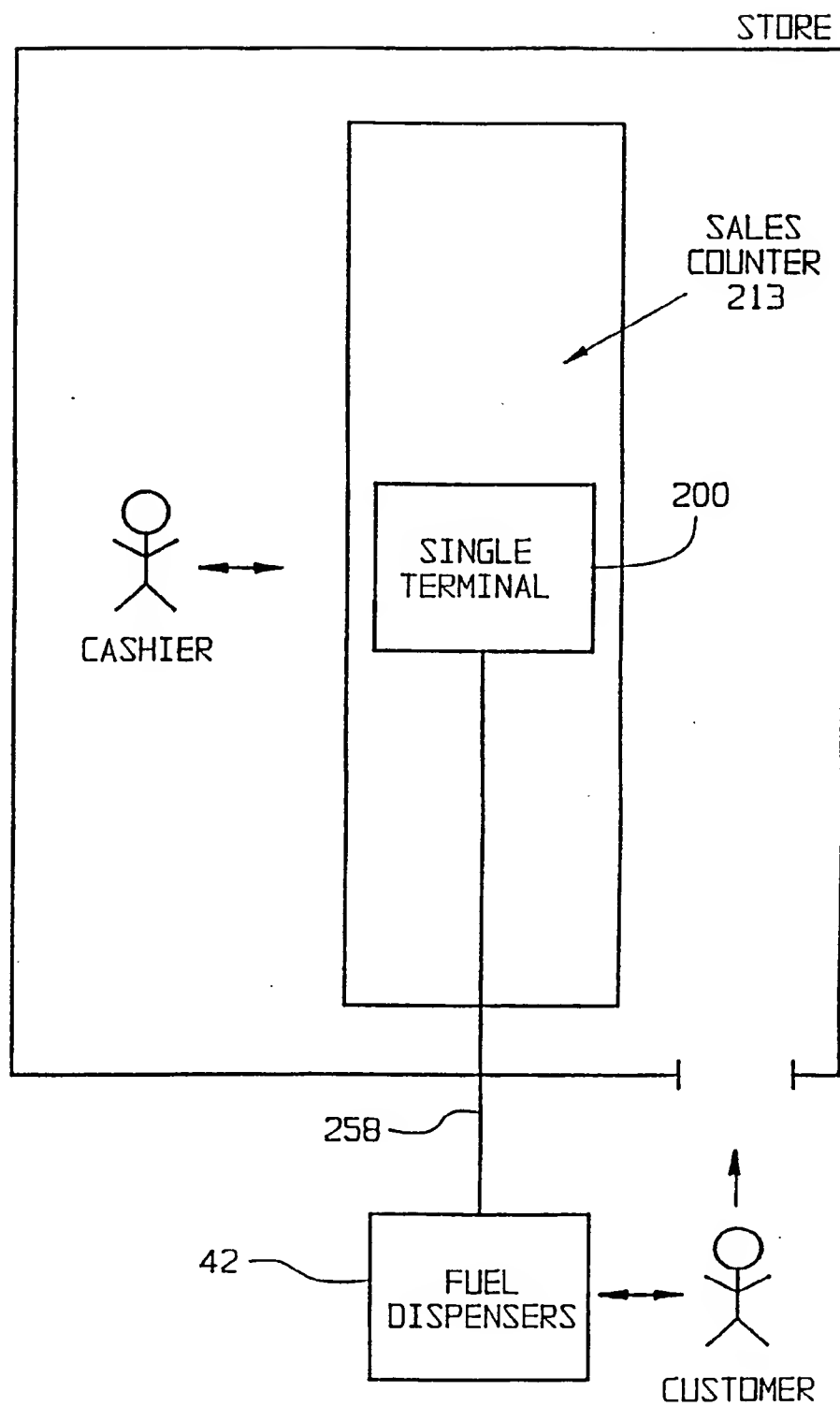
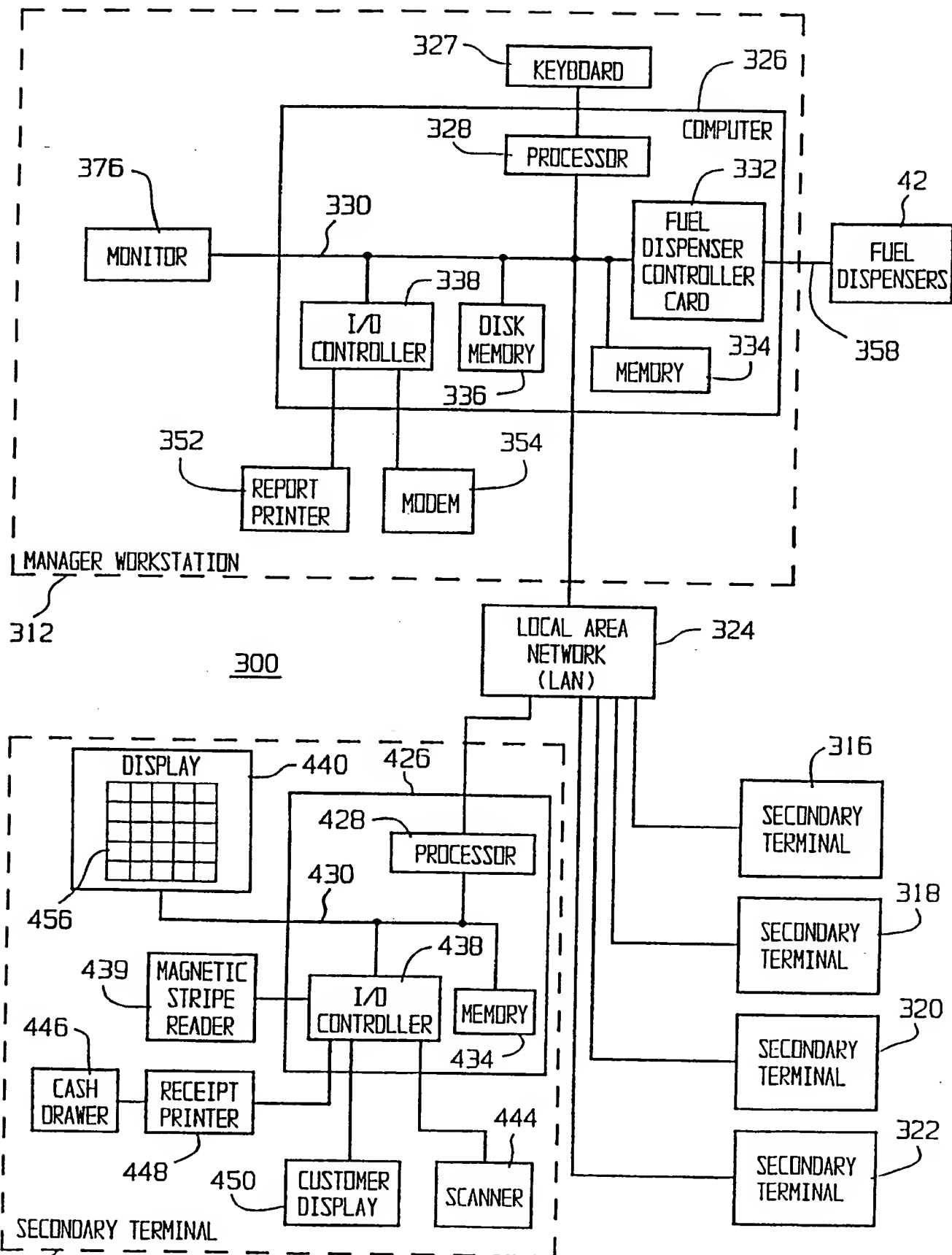


Fig. 5

*Fig. 6*



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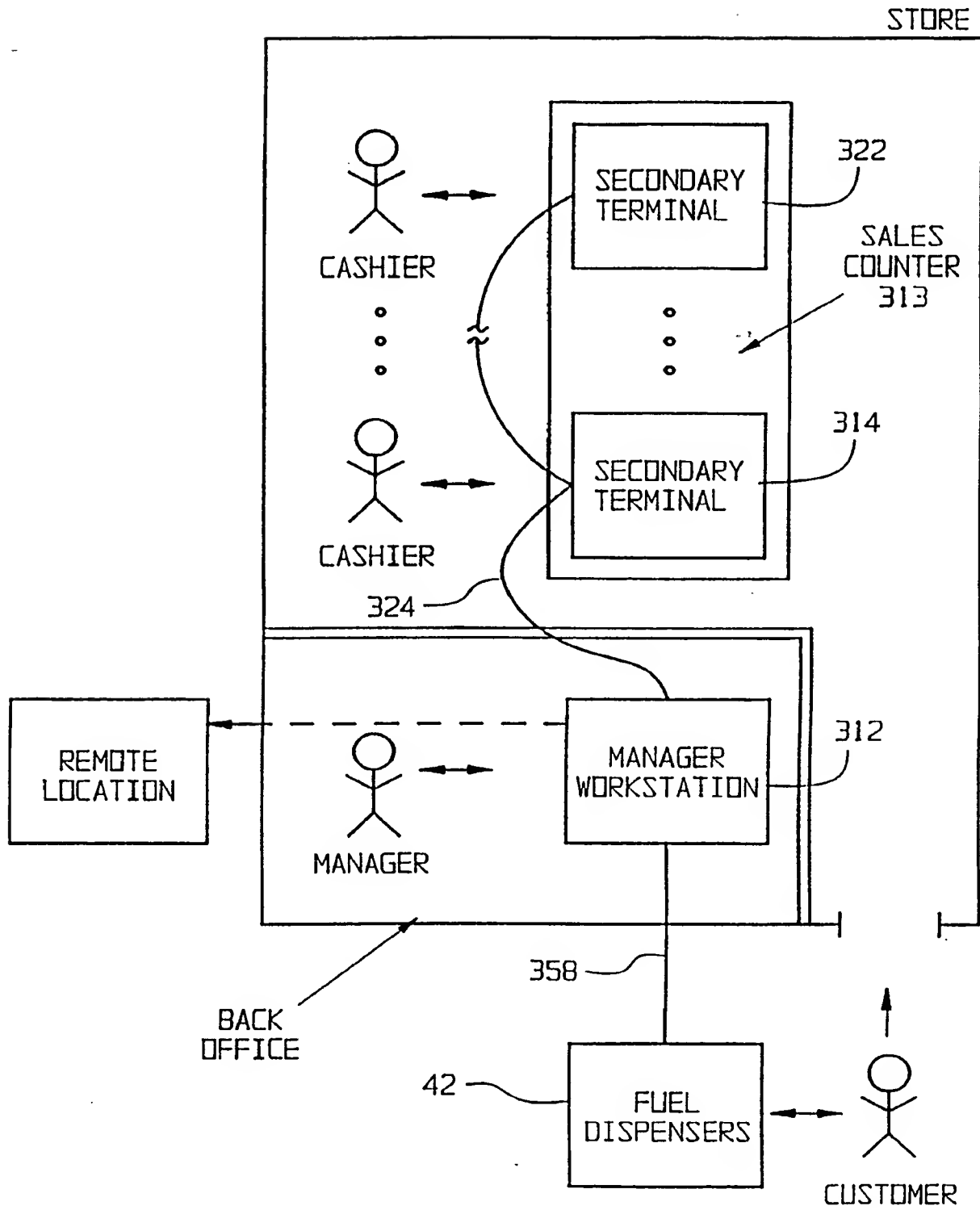


Fig. 8

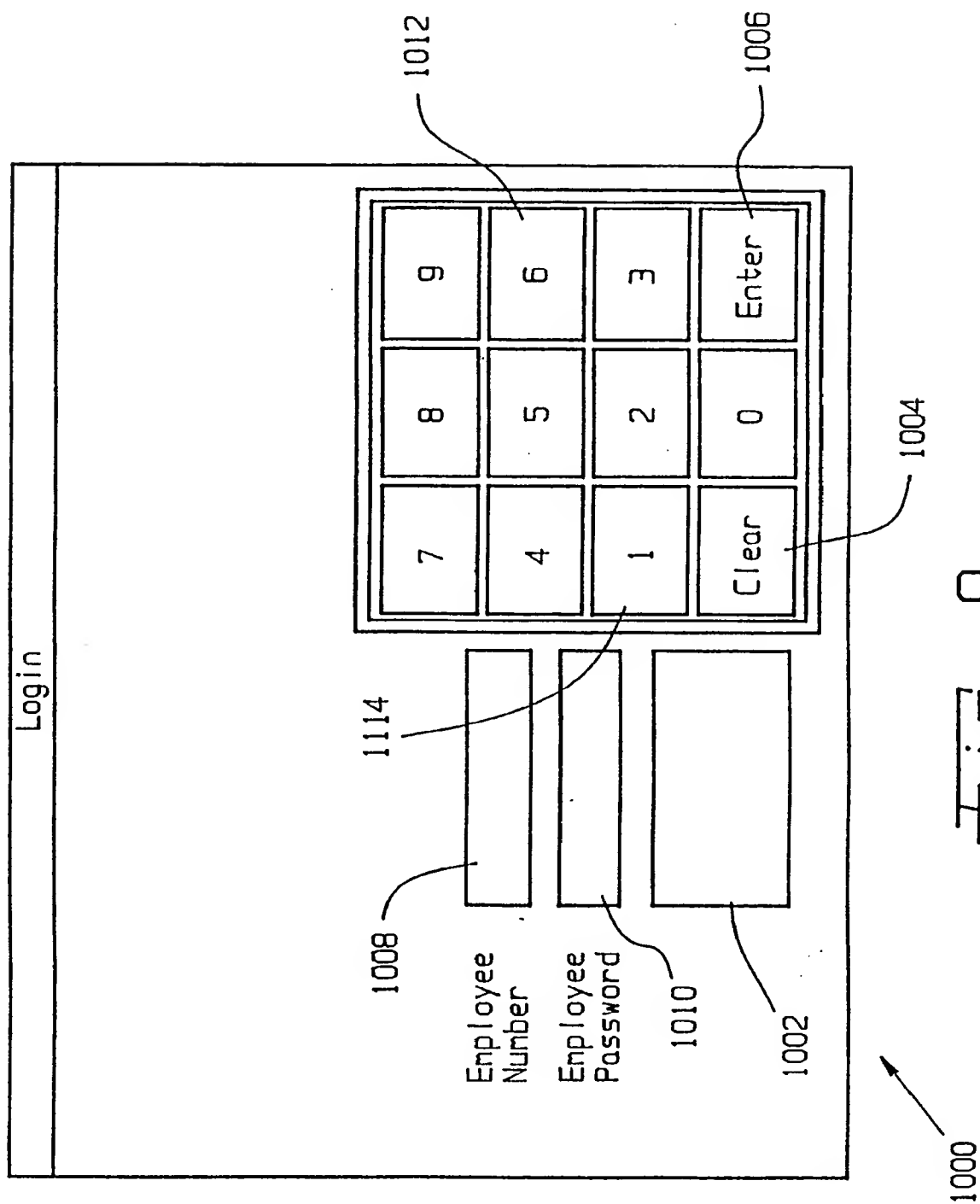


Fig. 9

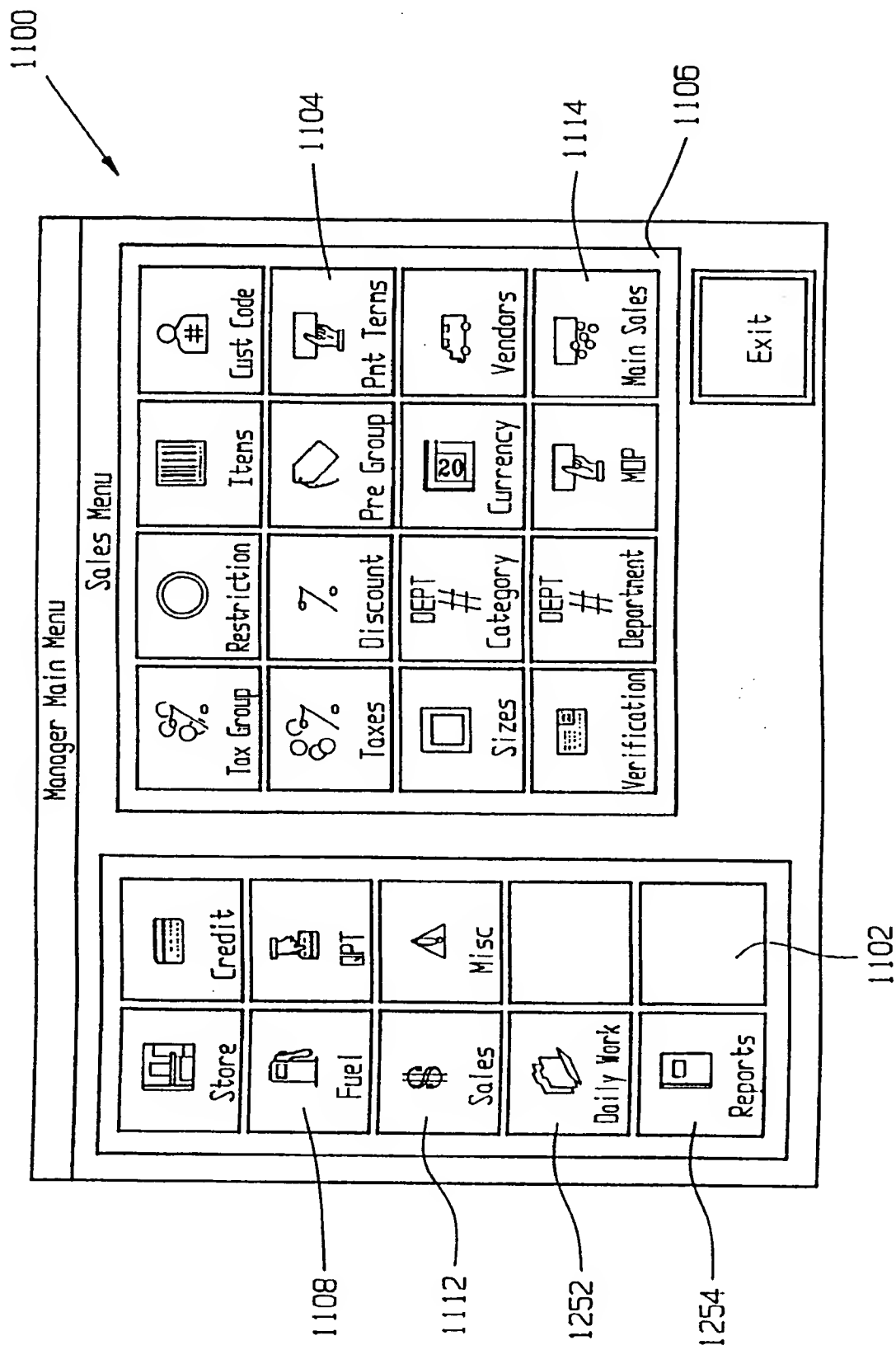


Fig. 10

10/15

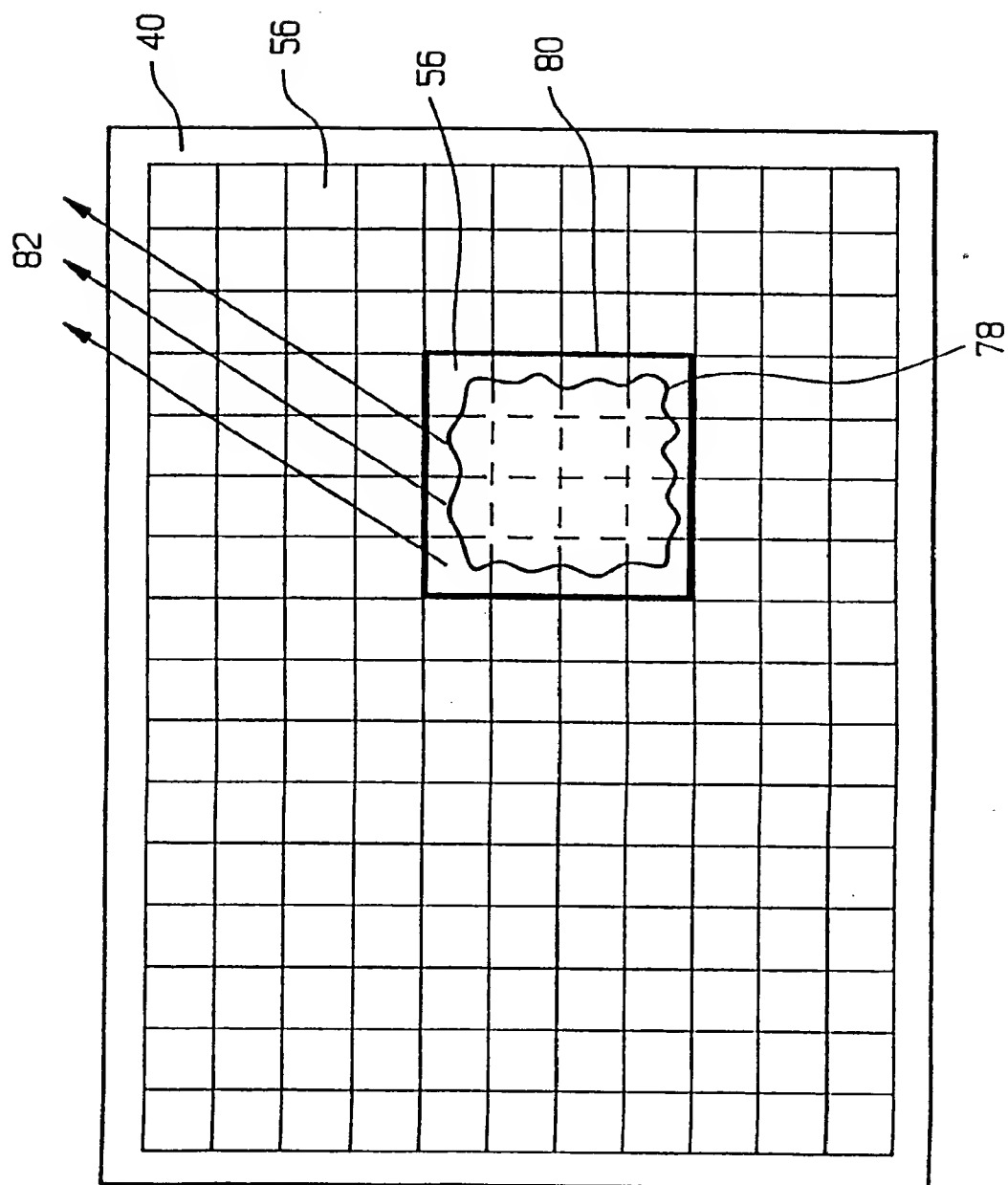


Fig. 11

11/15

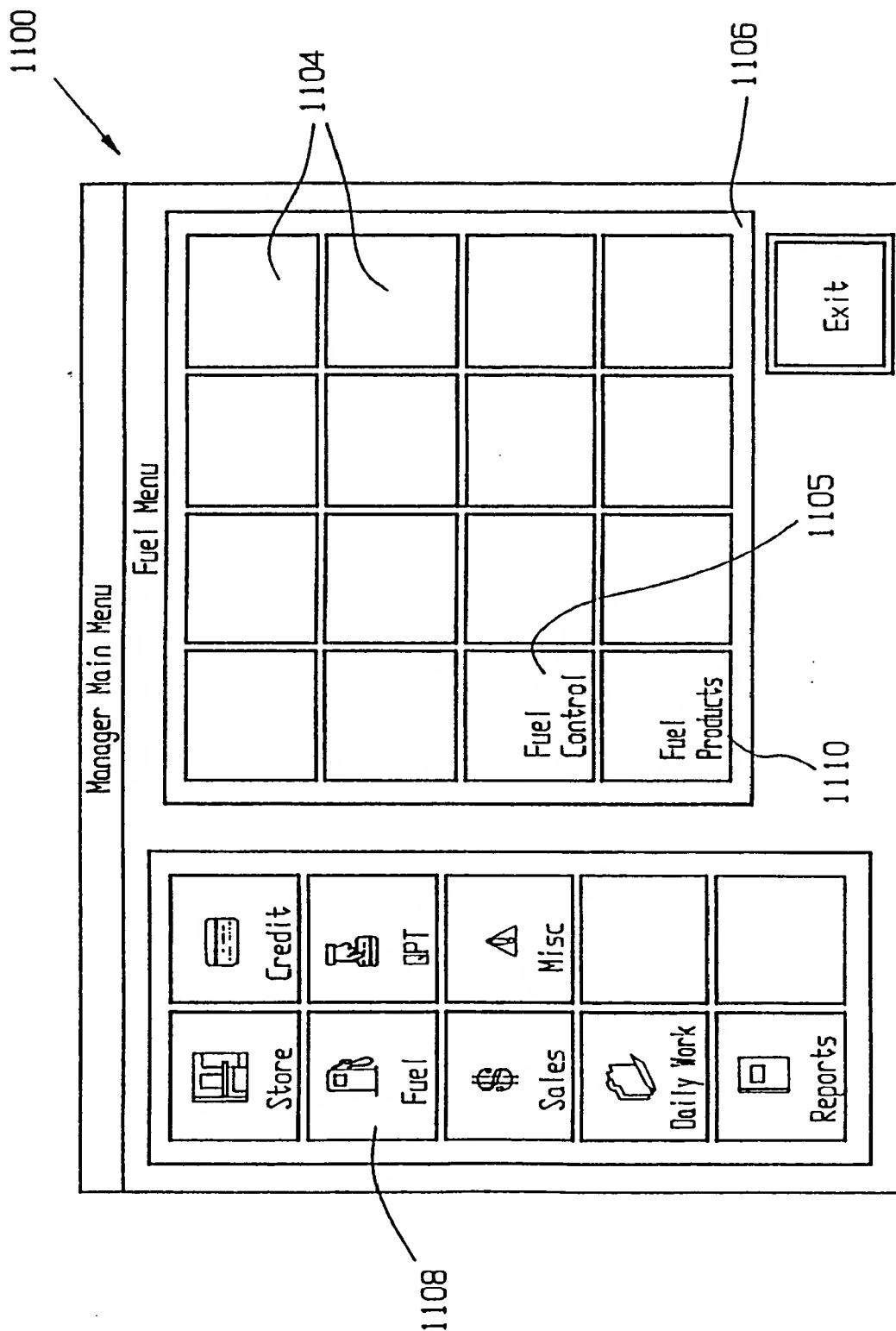


Fig. 12

12/15

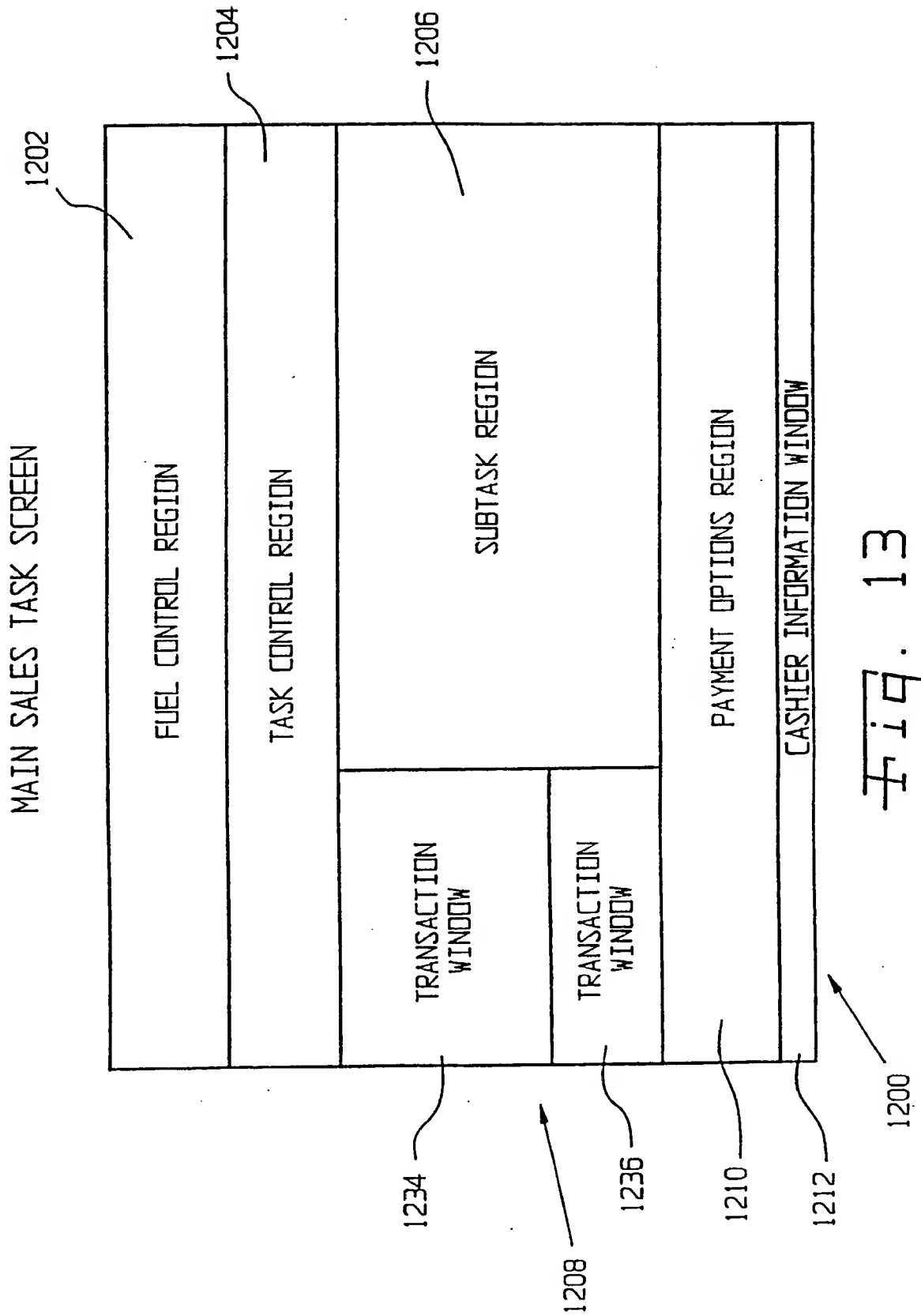
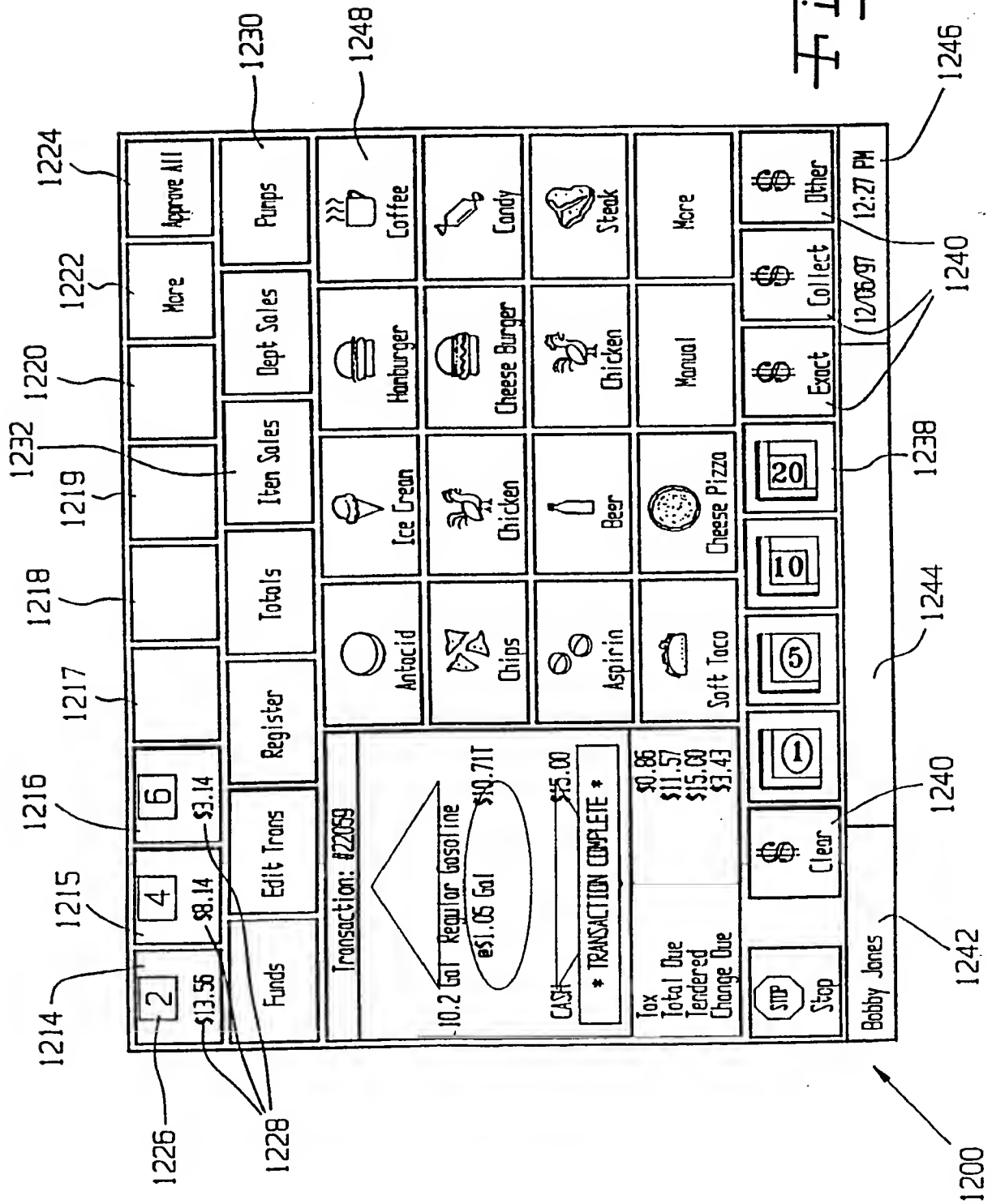


Fig. 13

Fig. 14



14/15

1232

2

\$13.56

4

\$8.14

6

\$3.14

4

\$20.43

Approve All

More

Funds

Edit Trans

Register

Totals

Item Sales

Dept Sales

Pumps

Transaction: #22059

10.2 Gal Regular Gasoline
~~\$1.05 Gal~~ \$19.711

1 Small Latte
~~\$0.65~~ \$0.65T

CASH \$15.00

Tax \$0.89

Total Due \$12.25

Tendered \$15.00

Change Due \$2.75

Small

Medium

Large

STOP

Stop

\$

Clear

1

5

10

20

\$

Exact

\$

Collect

\$

Other

Fred McKinley

12/06/97 12:27 PM

1250

1200

Fig. 15

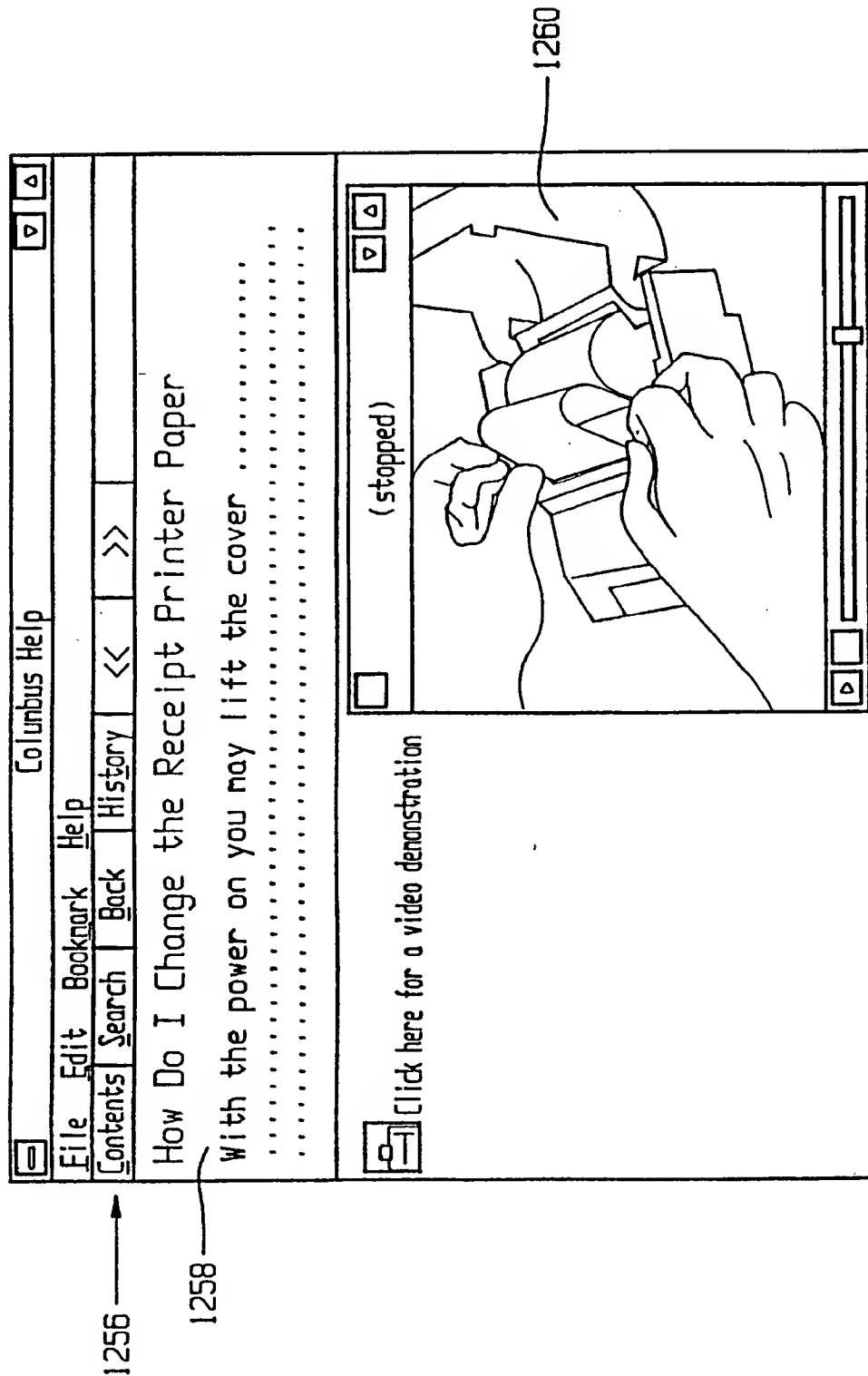


Fig. 16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/16883

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G06F 17/60

US CL : 705/16; 345/354; 364/188, 479.01, 479.11, 709.11; 705/413

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,394,336 A (WARN ET AL) 28 February 1995, see abstract.	1-5, 20 & 21
Y	US 5,400,253 A (O'CONNOR) 21 March 1995, see abstract.	1-5, 20 & 21
Y	US 5,546,523 A (GATTO) 13 August 1996, see column 5, lines 21-49; column 8, lines 40-45, and column 11, lines 42-50.	1-5, 20 & 21
Y, P	US 5,659,482 A (WARN ET AL) 19 August 1997, see abstract.	1-5, 20 & 21

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

28 NOVEMBER 1997

Date of mailing of the international search report

26 JAN 1998

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

EDWARD R. COSIMANO

Telephone No. (703) 308-9783

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/16883**Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)**

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 6-19
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

The dependency of claim 6, ("System of claim S ...") is unclear and hence the scope of this claim or claims 7-19 which ultimately dependent from claim 6, can not be determined.
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/16883

B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

235/375; 340/825.35; 345/339, 348, 352, 353, 354; 364/188, 479.01, 479.02, 479.1, 479.11, 709.01, 709.11; 705/1, 16, 18, 21, 22, 23, 24, 25, 413